

Figure 1 Left) Thermogravimetric analysis and Differential Thermal Analysis of powders of FeCuP_3 , MnCuP_2 and CuCuP_2 . Right) Powder x-ray diffraction patterns ($\text{Cu K}\alpha$ radiation) of the respective decomposition products.

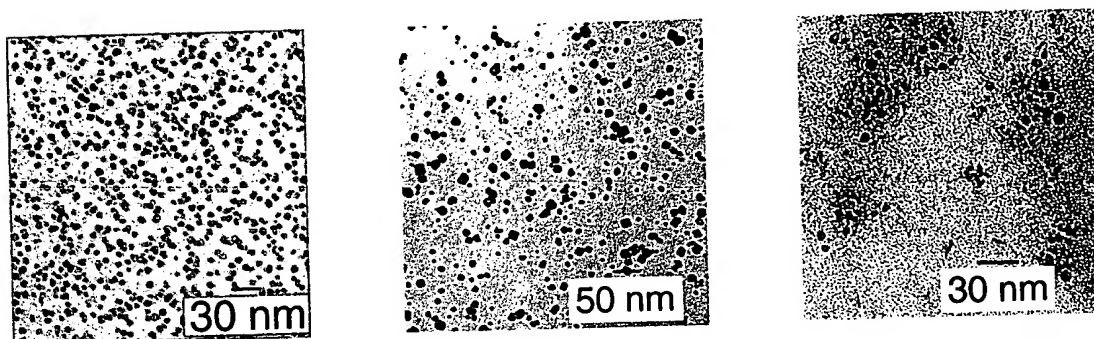


Figure 2 Low-resolution TEM images of $\gamma\text{-Fe}_2\text{O}_3$ (left), Mn_3O_4 (middle) and Cu_2O (right) nanocrystals. The average particle sizes and standard deviations are 6.7 ± 1.4 nm for $\gamma\text{-Fe}_2\text{O}_3$, 12.0 ± 4.7 nm for Mn_3O_4 and 6.9 ± 2.5 nm for Cu_2O .

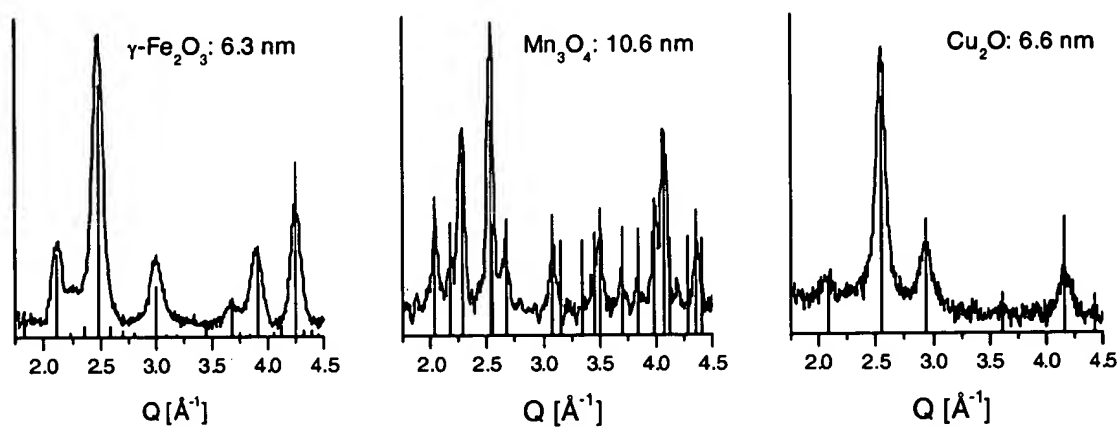


Figure 3 XRD patterns of $\gamma\text{-Fe}_2\text{O}_3$ (left), Mn_3O_4 (middle) and Cu_2O (right) nanocrystals and expected lattice reflections of the respective bulk phases.

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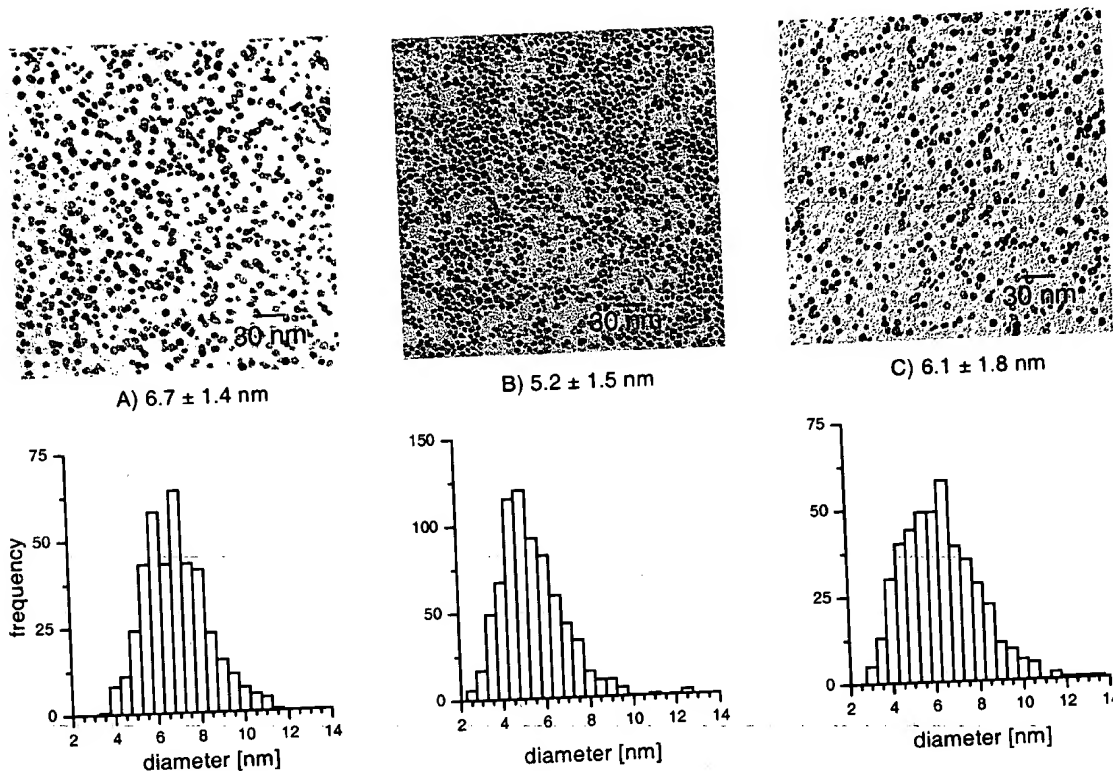


Figure 4 Low-resolution TEM images and respective diameter histograms of samples prepared under different conditions: A) Injection of 4 ml 0.3 M FeCuP_3 / octylamine into 7 g trioctylamine at 300 °C and refluxing at 225 °C for 30 min. B) Injection of 4 ml 0.3 M FeCuP_3 / octylamine into 7 g trioctylamine at 250 °C and refluxing at 200 °C for 30 min. C) Injection of 4 ml 0.3 M FeCuP_3 / octylamine into 7 g trioctylamine at 250 °C and refluxing at 200 °C for 5 min, then, additional injection of 2 ml stock solution and refluxing for 25 min at 200 °C.

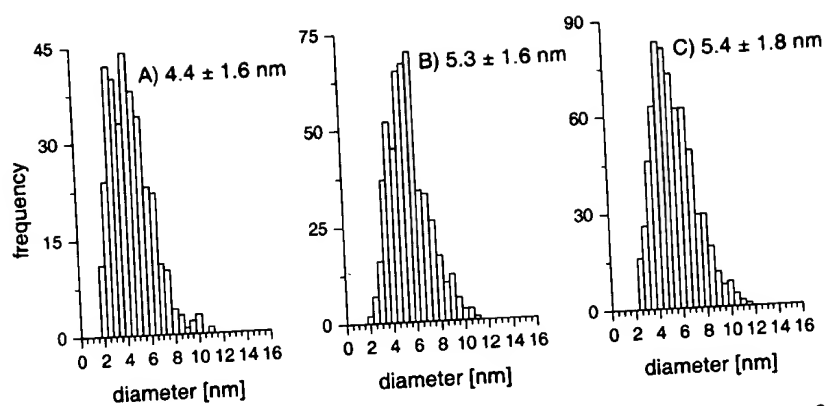


Figure 5 The time evolution of the particle size during refluxing at 200 °C as determined from low-resolution TEM imaging of aliquots taken at specific times from the reaction solution: A) 5 min after injection. B) 10 min after injection C) 30 min after injection of 4 ml 0.3 M FeCup_3 / octylamine into 7 g trioctylamine at 250 °C.

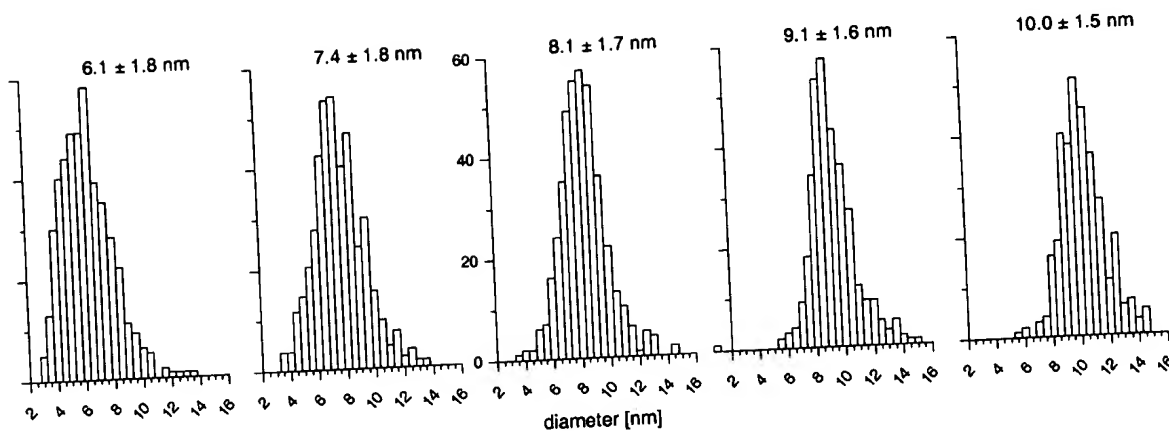


Figure 6 Size evolution of $\gamma\text{-Fe}_2\text{O}_3$ nanocrystals isolated by subsequent extractions of the reaction precipitate with toluene. The reaction conditions were as described in fig. 4C).

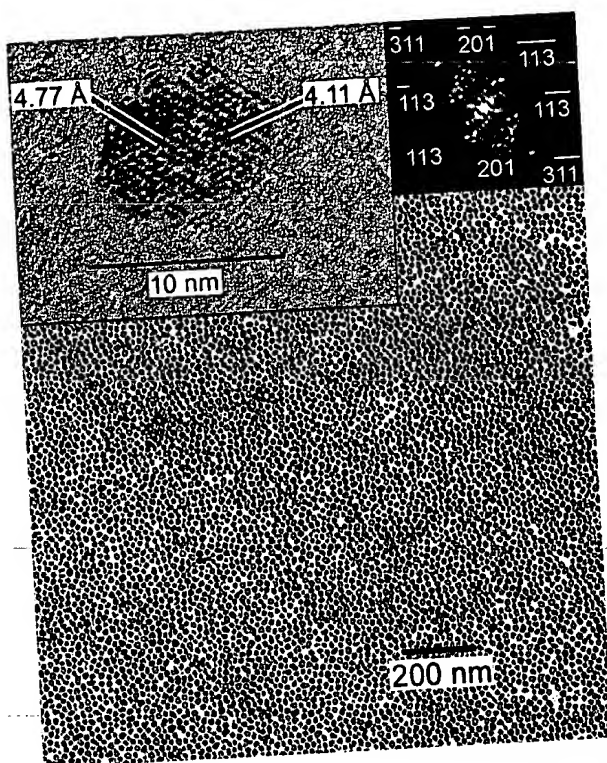


Figure 7 Low-resolution TEM image of a monolayer of individual $\gamma\text{-Fe}_2\text{O}_3$ nanocrystals (10.0 ± 1.5 nm) covering an area bigger than $2 \mu\text{m}^2$. Top left: High-resolution TEM image of one of the nanocrystals in this sample. The indicated lattice plane distances correspond to the (113) and (201) lattice planes of tetragonal $\gamma\text{-Fe}_2\text{O}_3$ with ordered superlattice of the cation vacancies. Top right: FFT of the high-resolution TEM image looking down the [51-2] zone-axis.

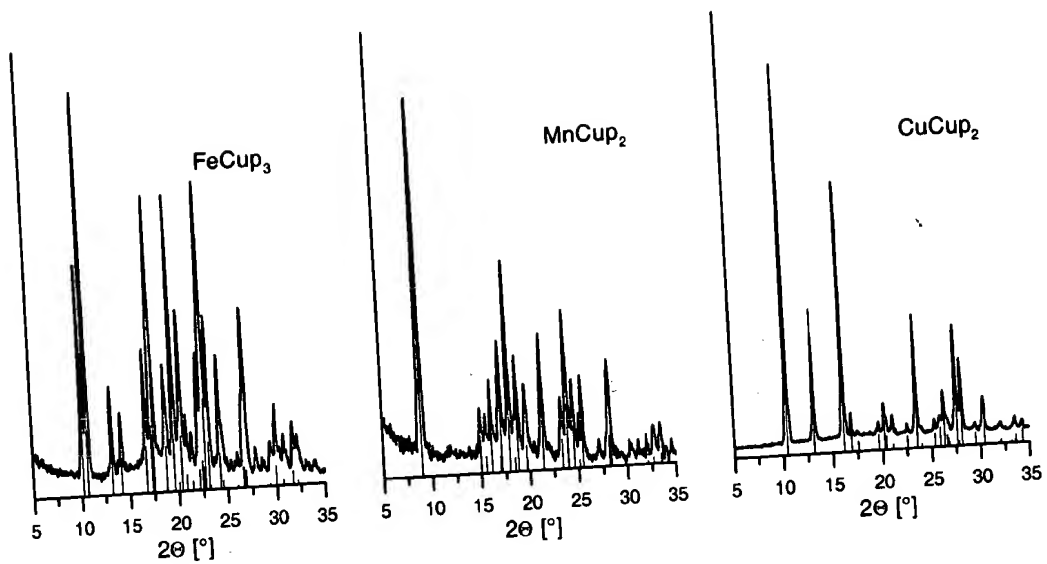


Figure 8 Powder XRDs ($\text{Cu K}\alpha$ radiation) of metal cupferronates.

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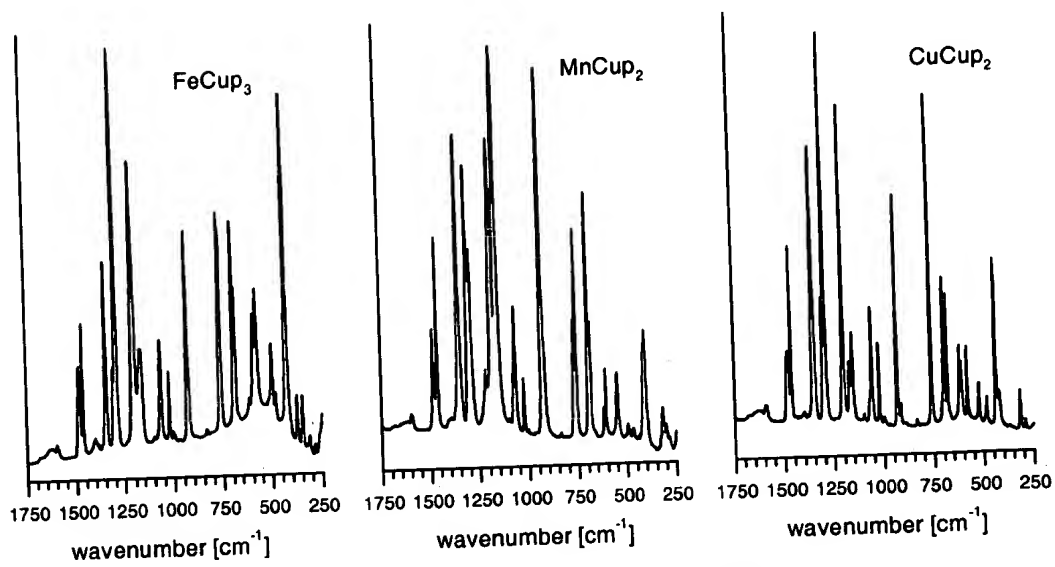


Figure 9 FT-IR spectra of metal cupferron complexes in KBr.